

Job Title: Research Associate in Ecology for Machine Learning and Citizen Science

Job Class: Research Associate 5

Start Date: Immediate opening

Location: University of Minnesota, School of Physics and Astronomy

Application instructions (further details at bottom):

1. Select the link to access our careers site.
2. Sign In to access your account or if you are not an existing user select the New User link to create one.
3. Review the job description and select the Apply button to begin your application.

<https://hr.myu.umn.edu/jobs/ext/337848>

If you are a current employee of our organization please use the following link instead:

<https://hr.myu.umn.edu/jobs/int/337848>

Application Deadline: By November 15, 2020 or until position filled.

Qualifications:

Required: Applicant must hold a Ph.D. in a relevant subject (e.g. in a data-intensive subfield of Biology, Ecology or Environmental Science) or in computer science (with publications in one of these subfields). It is essential that the applicant have mastery of a set of tools appropriate for working with large-scale data science including application of machine learning. A strong publication record in relevant academic field(s) is also required as is the ability to mentor students and work in a diverse, distributed team in an interdisciplinary manner with an ability to direct one's own research.

Preferred: Preference will be given to applicants who have experience implementing machine-learning algorithms in an Ecology research context, for example, with data generated from camera traps. Preference will also be given to applicants who have a demonstrated familiarity with data management and image processing tools; a demonstrated interest in citizen science; the ability to work independently and manage multiple projects; excellent organizational, presentation and writing skills; and demonstrated self-motivation and creativity. While based in Minneapolis, the successful applicant will be expected to travel to Chicago and Oxford, England.

Description:

The Zooniverse team in the School of Physics and Astronomy at The University of Minnesota has an opening for a Research Associate position with a focus on machine learning and data science applications in Ecology. Through volunteer classifications, Zooniverse projects use the combined input from a large number of imperfect classifiers to enable knowledge discovery from large-scale

datasets across the domains. Under the onslaught of even more data and as machine algorithms continue to improve, the Zooniverse team is investigating approaches that optimally combine human and machine classifiers. Zooniverse platform infrastructure has been implemented to enable this combined approach with great success in the Ecology domains. Funding has been obtained to explore applications of this combined approach in solving the problem of identifying individual animals (re-identification) in image or video captures. Furthermore, a collaboration between the Zooniverse and Wildlife Insights was recently funded to connect their APIs allowing for the easy transmission between the two platforms of relevant data sets and metadata including Deep Neural Network labels and crowd classification results for those research teams who want to exploit the benefits of each platform.

The successful applicant will work on several projects related to the extraction of data from camera trap images or video using artificial intelligence. Specific duties will include helping to build linkages between the Zooniverse platform and the Wildlife Insights platform to provide an integrated pipeline for camera trap practitioners, retraining and testing existing algorithms used for current camera trap projects on Zooniverse such as Snapshot Safari, and advancing the capabilities of existing algorithms to improve counts, behaviors, demographic data, and recognition of rare and endangered species as well as mounting experiments using crowd labels and machine learning to enable individual animal identification.

The research associate will be supervised by Lucy Fortson, faculty member in Physics and Astronomy, co-founder of Zooniverse and director of the Zooniverse effort at UMN. The UMN Zooniverse effort comprises science team members across multiple Zooniverse projects including many in Ecology, several data science post-docs working in astronomy, medical imaging and digital humanities, and a dedicated Zooniverse web developer. The successful applicant would also work closely with Zooniverse team members at the Adler Planetarium in Chicago and the University of Oxford, UK who are guiding and developing the Zooniverse platform infrastructure to combine human and machine classifiers; there is a budget for several collaborative visits to these locations for this project. Additionally, the research associate would work closely with the Wildlife Insights team aiming to assist other research teams identified in using the data science infrastructure on both platforms. Strong collaborations exist between the Zooniverse team led by Fortson and the Snapshot Safari Zooniverse project operated out of University of Minnesota's Lion Center, as well as other UMN ecology teams. The research associate would be given the opportunity to collaborate scientifically with these teams working towards the publication of ecology research exploiting the data obtained through Zooniverse projects. The successful applicant would be expected to work with and directly mentor graduate students from the UMN Data Science Masters program as well as undergraduates from a range of domains, with assistance from several faculty in Computer Science and the Informatics Institute at UMN who are engaged in Zooniverse projects. The position is grant-funded for two years with the possibility of continued funding if further grants are successful.

Responsibilities/duties

- 40% Manage Zooniverse-Wildlife Insights Integration** Work with Wildlife Insights collaborators and ecology research teams to implement and test outcomes of initial projects using the combined platforms. This includes help in preparation of meta-data, processing of data through existing ecology ML models, assistance with setting up related Zooniverse projects and the aggregation of the ensuing crowdsourced data. Assist as needed with retraining and testing of existing algorithms used for current ecology projects on Zooniverse.
- 20% Zooniverse Experiments:** Lead the implementation of experiments combining machine learning and volunteer classifiers on Zooniverse ecology projects with the aim of contributing to a solution for individual animal identification in these projects. Advance the capabilities of existing algorithms to improve counts, behaviors, demographic data, and recognition of rare and endangered species.
- 20% Ecology Research:** carry out a research program and communicate results on at least one of the above efforts via academic publication in appropriate journals. Mentor graduate and undergraduate students who are tasked with developing, implementing and analyzing aspects of the above effort.
- 20% Communication, dissemination and development:** Take the initiative to keep all project stakeholders informed of progress or concerns. Represent the Zooniverse team at meetings and conferences as required. Work with external collaborators to understand the requirements imposed on the Zooniverse system by the needs of scientists who are making use of it and document these needs. Take a leadership role in group meetings and discussions on strategy and development. Contribute as appropriate to project reports to granting agency. Maintain professional development, trying out and becoming familiar with new technologies through individual initiative as well as through drawing on collaboration and support from team members.

Application Instructions:

We only accept on-line applications (see url above). The position is open effective immediately. Applications will be accepted until the position is filled.

Please provide:

1. a cover letter explaining why you are interested in the position and why you believe you are qualified,
2. curriculum vitae including recent publications,
3. a 1-2 page research experience statement highlighting any machine learning work you have done,
4. the names and complete contact information for three references.

Additionally, have three letters of reference sent preferably via email to:

Professor Lucy Fortson
School of Physics and Astronomy
University of Minnesota
116 Church Street SE
Minneapolis MN 55455
lfortson@umn.edu

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